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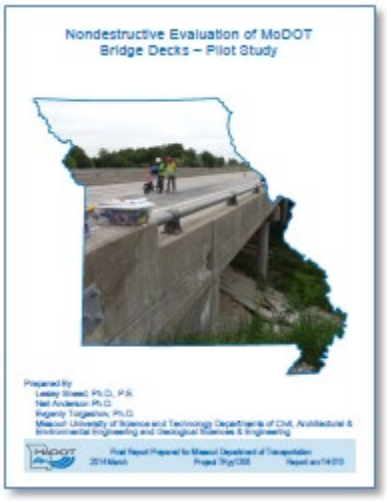
Research Summary

TSMO Strategies and Automation in Work Zones



Managing traffic during construction is essential to minimizing delays, maintaining access for businesses and residents, ensuring traveler and worker safety, and completing projects efficiently. As congestion, safety concerns, and workforce constraints continue to challenge transportation agencies, effective work zone management using Transportation Systems Management and Operations (TSMO) strategies has become a critical priority. TSMO emphasizes communication, coordination, and operational efficiency.

This research project supported Missouri Department of Transportation's (MoDOT) advancing TSMO mission and work zone management priorities by implementing and evaluating existing, proven TSMO strategies within an active Missouri work zone. Rather than developing new technologies, this project focused on identifying available strategies, demonstrating their use in practice, evaluating their effectiveness, and developing construction-ready recommendations for future projects.

The study centered on Smart Work Zone (SWZ) deployments and aimed to quantify their effectiveness while documenting best practices that support consistent and repeatable application across MoDOT construction projects. Key focus areas included identifying proven SWZ deployment practices, aligning project characteristics with appropriate SWZ solutions, and developing guidance to institutionalize SWZ systems within MoDOT's standard policies and procedures. These efforts support improved work zone safety, enhanced mobility, mitigation of workforce constraints, and scalable statewide deployment of advanced work zone strategies.

Results demonstrate that safety and mobility benefits from SWZ deployments depend not only on technology, but also on strong institutional practices, clear guidance, and consistent decision-making frameworks. Enhancing how existing tools are selected, deployed, monitored, and evaluated is critical to achieving reliable outcomes.

"Streamlining guidance, improving access to decision-making tools, and standardizing Smart Work Zone practices will enable MoDOT to achieve more consistent safety outcomes, reduce work zone crashes, and deploy SWZ solutions more effectively statewide."

Based on the findings, a comprehensive set of recommendations was developed to advance MoDOT's SWZ program. Recommendations span policy, guidance, design, operations, and training, including decision-support tools, updates to existing guidance documents,

standardized template Job Special Provisions and operating procedures, and consistent conventions for device naming and performance monitoring.

Figure 1: Phase 1 WB I-44 in Springfield, MO; July 2025

Project Information
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